In search of woolly spider monkey

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Abstract. A preliminary observation of woolly spider monkeys (*Brachyteles arachnoides*) was done in the State of Minas Gerais, Brazil, in August, 1977. The results are described in comparison with the woolly monkey (*Lagothrix*) and the spider monkey (*Ateles*), which are classified into the subfamily *Atelinae* with the woolly spider monkey, mainly for: morphology and locomotion, grouping pattern, vocalization and feeding habits. The comparison of climate and vegetation is also roughly made between Amazonian Basin, which is the main habitat of woolly monkey and spider monkey, and south-eastern Brazil, where the woolly spider lives.

INTRODUCTION

Most of the information about the woolly spider monkey (*Brachyteles arachnoides*) which I obtained before my field trip to Brazil came from *Primates* (vol. 5) by W. C. O. Hill (1962). This book, which is an encyclopedia of primates, included almost all the data which had been published up to the end of 1950's.*

Hill (1962) has noted that "the woolly spider monkey is the rarest and least known South American Primate." In fact, almost nothing is known about the behavior of the woolly spider monkey in its natural habitat. Similarly, only limited behavioral data have been obtained from the observation of woolly spider monkeys in captivity. There are only several cases where the animals have been kept in European or American zoos since the 19th century. Moreover, keeping them in captivity is a difficult task and most of the animals kept in zoos have died within one year of their captivity. Morphological studies of woolly spider monkeys have also been rarely made on account of the lack of specimens, as compared with other New World monkeys. While woolly spider monkeys seen worthy of study for these reasons alone, I took interest in them for other reasons mentioned below.

The woolly spider monkey is usually classified into the subfamily *Atelinae* with the woolly monkey (*Lagothrix*) and spider monkey (*Ateles*). In this subfamily, *Lagothrix* and *Ateles* are morphologically the most distinct from each other, while *Brachyteles* stands halfway between them "having the large size, robust build and characteristic

* I obtained a monographic report on woolly spider monkeys which was written by Alvaro Coutiho Aguirre when I was in Brazil. What is the most valuable in this report seems to be the data on the distribution of woolly spider monkey. They include not only the habitats of this species which was confirmed in the end of 1960's, but also the localities where it had been extinct and it had been collected as scientific specimens since 1810's. (Fig. 3).

pelage of *Lagothrix*, with the elongated limbs and reduced or absent pollex which characterize *Ateles*." These characteristics of the woolly spider monkey might imply "phylogenetic senescence" or the fact that this species being comparatively near to the ancester of *Atelinae*. Socio-ecological studies of woolly monkeys have been done in the upper Amazonian Basin (Nishimura, 1974, 1976; Nishimura & Izawa, 1975) and some other places (Durham, 1975; Kavanagh & Dresdale, 1975).

Socio-ecological studies of spider monkeys have been done by many researchers since the 1930's (Carpenter, 1935) among which the works by Klein (1972) or Klein & Klein (1973, 1975, 1977) is the most extensive (Wagner, 1956; Eisenberg, 1966; Richard, 1970; Durham, 1971, 1975, Izawa, 1975, 1976). I have also frequently had chances to observe spider monkeys while making serveys of the woolly monkey (Izawa, 1976). Judging from these studies on the woolly monkey and the spider monkey, it is clear that they are considerably different from each other regarding their ecology and behavior. The socio-ecological studies of woolly spider monkey, which, from the morphological point of view, stands halfway between woolly monkey and spider monkey, will give a clue to explain the ecological and behavioral difference between the woolly monkey and the spider monkey and will greatly help us develop a more inclusive understanding of *Atelinae*.

Hence, the woolly spider monkey is interesting in itself; in addition, south-eastern Brazil, where this species is distributed, is also attractive to me. First, this region is greatly different from the Amazonian Basin, which is the main habitat of New World monkeys, in its process of geological formation. South-eastern Brazil, having been a part of the Gondwana land, constitutes one of the oldest stratum in the South American Continent, while the main structure of Amazonian Basin is said to have been formed in the Tertiary period (Hamada, 1977). Second, not only in the *Atelinae* but in some other taxonomic groups of *Primates,* the species which seems to have comparatively primitive characteristics in each group is found in this region, as masked titi (*Callicebus personatus*) in the genus *Callicebus,* or golden lion tamarin (*Leontopithecus rosalia*) in the family *Callithricidae*. Based on these, this region is said to be one of the distribution centers of New World monkeys (*Hershkovitz,* 1977). Therefore, studying this region in comparison with the Amazonian Basin will help us elucidate the evolution of the New World monkeys.

The woolly spider monkey is also an animal which is in danger of extinction, being listed in the IUCN's "Red Book". Hill (1962) maintains that the "woolly spider monkey is on the way to extinction from phylogenetic senescence." This may be one of the reasons for the precarious condition of this species, but it is my belief that artificial factors are of greater importance. Even in the Amazonian Basin, which might be one of the most unexplored region in the earth, recent development has been amazing, with the result that the primates are decreasing rapidly through hunting, capture and forest destruction. In South-eastern Brazil, which is one of the regions with the highest population density in South America, including São Paulo and Rio de Janeiro, the extent of development would not be compared with the Amazonian Basin. Coimbra-Filho and Mittermeier (1973, 1978) report the present condition of golden lion tamarin, which lives in several restricted places in south-eastern Brazil, is very precarious. It was thought to be urgent to make survey of woolly spider monkey for this meaning, too.

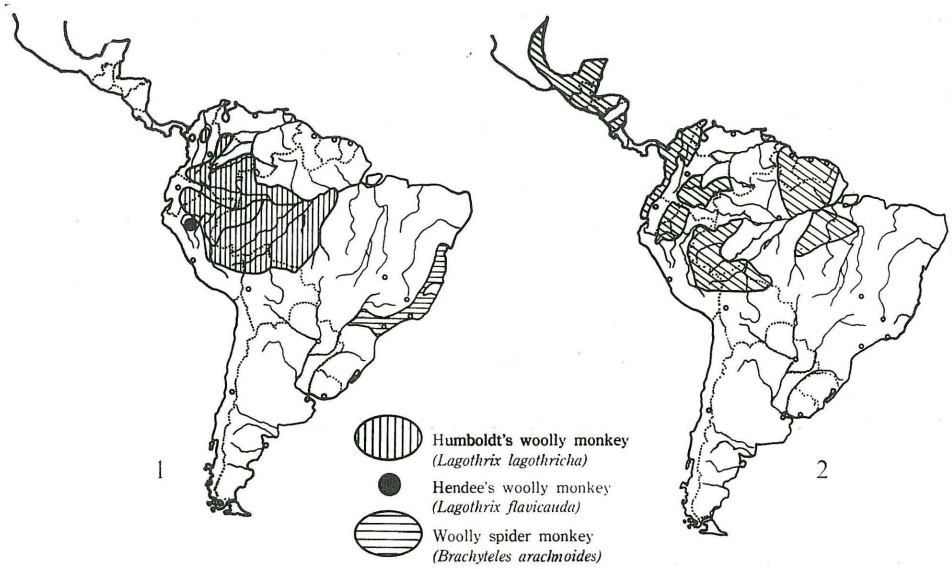

Fig. 1. Distribution of woolly monkey and wooly spider monkey (After Fooden, 1963 and Aguirre, 1971. Fooden, 1963 is partly revised based on the personal communication with J. Cassidy)

Fig. 2. Distribution of spider monkey (Hill, 1962 is partly revised based on the personal communication with T. Watanabe and J. Cassidy)

I stayed in Brazil for five weeks from July 29th to September 1st, 1977. During this time data was obtained for the woolly spider monkey by: 1) observation at the São Paulo Zoo, 2) visits to the Rio Doce State Forest Park, which is said to be one of the habitats of the woolly spider monkey (Aguirre, 1971), 3) observations in the wild in Fazenda Montes Claros, 4) discussions with Brazilian researchers.

I. Woolly spider monkeys in São Paulo Zoo

I visited Sao Paulo Zoo (Parque Zoologico de São Paulo) on the 10th of Septemper. Woolly spider monkeys were not open to the public, but kept in the special corner there. Dr. Mario P. Autuori, the director of Zoo, said that the Zoo once kept 6 or 7 woolly monkeys, all but one of which subsequently died of a disease at the same time. During my visit three individuals were kept, an adult female which survived the disease, and an adult female and a juvenile male which had been recently captured. All these individuals were said to have been captured in Sao Paulo State. In São Paulo Zoo, there are no recorded cases of breeding of woolly spider monkeys. Neither have European nor United States zoos succeeded in breeding the animal (Hill, 1962). This appears to show its inadaptability to artificial conditions.

I was struck by the shape of woolly spider monkeys when I saw them for the first time. As described by Hill (1962), indeed they had morphological characteristics common to woolly monkey and spider monkey, but, at the same time, the ones peculiar to woolly spider monkey was conspicuous. For example, the face. New World monkeys are sometimes called platyrrhines (wide nosed forms) because the

nostrils are widely separated from each other. However, the nose of woolly spider monkey was like that of catarrhines (narrow-nosed forms). Nostrils were big and pointed upward and face color was dark. On account of this the face of the woolly spider monkey looked like that of the gorilla. One of the native names of woolly spider monkey is "mono carvoeiro" (charcoal burner or charcoal dealer), which is probably due to the darkness of the face. (Photo. 3)

Female spider monkeys have such a long clitoris that an inexperienced person often takes it to be a penis. The clitoris of the woolly monkey is also prominent in comparison with other New World monkeys, although not so as that of the spider monkey. In contrast to the spider monkey and the woolly monkey, the clitoris of the woolly spider monkey was as small as that of macaque. In the meantime, the male woolly spider monkey which was kept in São Paulo Zoo was a juvenile and his comparison with other species with respect to the genital organs will mean little.

II. Rio Doce State Forest Park

I stayed in Rio Doce State Forest Park (Parque Florestal Estadual do Rio Doce) from 14th to 20th in August. This park is said to be one of the habitats of woolly spider monkeys (Aguirre, 1971). It is situated at the junction of the River Doce and the River Piracicaba, a tributary of the former, bordering on the left bank of the former

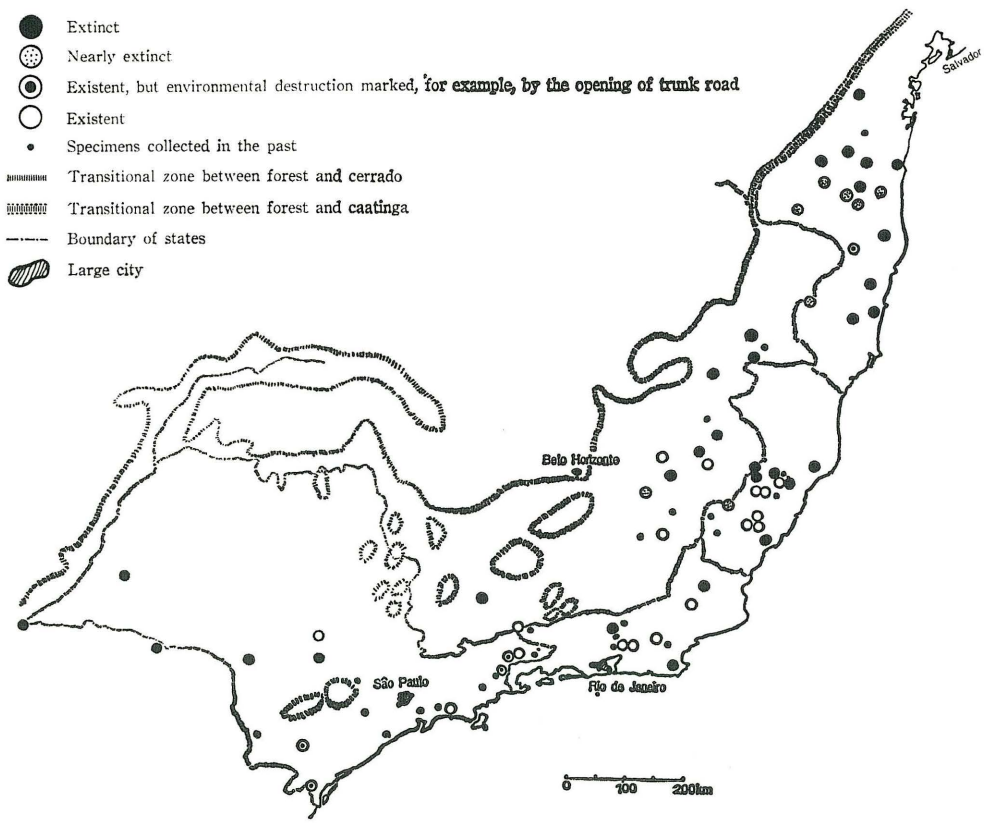

Fig. 3. Distribution of woolly spider monkey (After Aguirre, 1971)

stretching over 30 km and on the right bank of the latter over 8 km. It is the largest (36,000 ha.) and the oldest (founded in 1944) among state parks in the State of Minas Gerais. Rio Doce Park has low hills dotted with about 20 large and small lakes.

During my stay in the park, I obtained little information on the woolly spider monkey. This lack of success was probably due to the following reasons. First, I was unable to meet anyone who was well acquainted with animals and the forest in this park. I only met the inspector of the park and the soldiers who patroled there, but they knew little about the animals. Second, I had no car available. The park was large (36,000 ha.) and the primary forest was considerably scattered as mentioned below, so the investigation was difficult without a car. However, there seemed to be little doubt that the woolly spider monkey existed there. I happened to meet a worker, called São Francisco, on the day before I left the park. He said he had been working there for more than twenty years and had frequently met the woolly spider monkey, his last encounter being two or three months before. He gave an imitation of the vocalization of it.

The primary forest occupied an unexpectedly small area in the park. This was mainly due to about 40% of the forest having been destroyed by fire, which had occurred repeatedly since 1944 when the park was established. Besides, it seemed that no small part in the forest had been already cut down by that time.

I was impressed, while walking through some parts in the park where the primitive forest remained in considerably wide range, that it was quite like that in the Amazon. For example, trees were slender with few branches, the undergrowth was poor on account of canopies being highly developed, and a tremendous variety of trees were found in a small area. However, the humidity of the forest in Rio Doce seemed to be low compared with Amazonian forest. The low humidity would be probably due to the fact that the time when I stayed in south-eastern Brazil fell during the dry season, while when we walked through Amazonian forest for a while, even in the dry season, we were covered with sweat as if we were in a suana. As previously stated, wood fire had repeatedly occurred in this park, which would be partly because of the low humidity in dry season.

Table 1, based on the data which I obtained by courtesy of the park authorities, provides information concerning the trees found in Rio Doce Park. The species

Table 1. Tree components in Rio Doce Forest Park (After Carlos de Araujo, 1976)

Family	Number of species	%
1. Leguminosae	74	33.4
2. Lauraceae	17	8.9
3. Bignoniaceae	15	7.8
4. Apocynaceae	10	5.2
5. Lecythidaceae	9	4.7
6. Moraceae	7	3.7
7. Rutaceae	6	3.1
8. Melastomaceae	6	3.1
9. Euphorbiaceae	6	3.1
10. Annonaceae	5	2.6
11. Myristicaceae	5	2.6
12. Myrtaceae	4	2.1
13. Anacardiaceae	4	2.1

belonging to *Leguminosae* seems to take up an extremely high proportion in Rio Doce Park in comparison with that in the Amazonian Basin. This might also imply that the vegetation in south-eastern Brazil is drier or more like savanna than in the Amazonian region.

III. Observation of woolly spider monkeys in Fazenda Montes Claros

I stayed in Fazenda Montes Claros from 21st to 27th in August. The details of how I came here are as follows. I first visited Manaus in Brazil. There I met Mr. Anthony Ryland, who was a student of Oxford University and was making an ecological study of New World monkeys staying at INPA (Instituto Nacional de Pesquisas da Amazonica). He showed me a clipping of the January 5, 1977 issue of "Veja", a Brazilian weekly magazine, whicn told "Professors Ney Carnevalli and Celio Valle of Federal University of Minas Gerais succeeded in observing and filming woolly spider monkeys at Fazenda Montes Claros in the State of Minas Gerais, last year (1976). They are appealing for the protection of this valuable habitat." I visited University of Minas Gerais in Belo Horizonte to meet them on the 11th and 12th of August. They gave me the information on Fazenda Montes Claros, which they had visited twice. They also suggested I should visit Rio Doce Park.

The owner of Fazenda Montes Claros was called Feliciano Miguel Abdala, 70 years old, the son of an Arabian immigrant. This fazenda (farm) was situated about 50 km east of Caratinga, where the owner lived, following a mountain road. Along the road small villages were seen at intervals of several kilometers, which were surrounded by farms. The driver of a car which I took from Rio Doce Park to Montes Claros was born and brought up in Caratinga. He said all these farms belonged to Mr. Abdala and most of the habitants of small villages were his tenants. Thus the forest where the woolly spider monkeys lived was adjacent to one of the farms which lie scattered among lands owned by Mr. Abdala.

1. Topography and vegetation of study area

Montes Claros is in the low mountain ranges, which have an altitude from 800 to 1200 m above the sea, in south-eastern Brazil. The major topographical components of the study area were two ridges which lay east and west, parallel to the Mañuacu River at its south bank. Another ridge extended approximately north and south connecting the former two ridges to each other. The two valleys which lay on either side formed a common watershed for this ridge. The main course of the two valleys had running water, while their branches were dried up at the time I stayed there. Of these two valleys I named the one which run toward east or north "Palmito" and the other "Poltão" (Fig. 4).

Both valleys had roads through which cars were passable, while the one in Poltão, which was constracted when wood had been carried out from this valley, was rarely used while I stayed there. However, people and cars passed through the road in Palmito everyday, because there were several houses along it and it led to farms which extended into the back of the study area. In other parts of the study area, for example, on the slope or on the ridge, no trails seemed to exist. (Photo. 5)

Vegetation was considerably different between the valley and the mountain slope. Vegetation of tropical rain forest type with evergreen trees being tall, slender and of

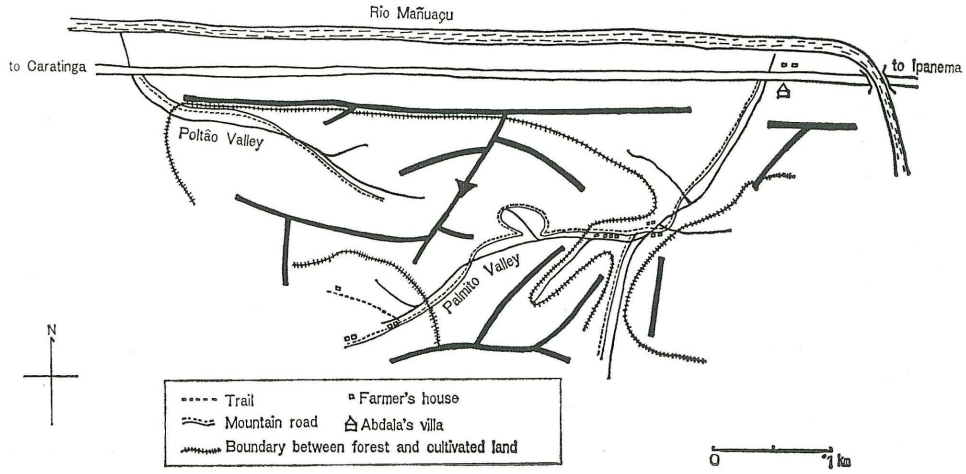

Fig. 4. Rough map of study area

well developed canopies were dominant along the valley, while on the mountain slope trees were smaller and of sparse canopies and some of them were deciduous. Some trees in the forest along the valley could be sold as very expensive timbers, so they had been considerably cut down and were continued to be cut bit by bit at that time. Along the valley, especially along Palmito valley, surprisingly many palmito palms (*Euterpe edulis*) grew (It was the reason why I named this valley "Palmito"). In South America, people are very fond of eating young pith of the palmito palm; wild palmito is rarely found where there are inhabitants. It could be because Mr. Abdala prohibited people to collect the palmit in Montes Claros that it grew there in such abundance. It was said that the area where the primitive forest remained, including the one from which lumbers were extracted and the one which intermixed the secondary forest to a small extent, was 560 ha. in Fazenda Montes Claros. The other area was turned into coffee plantation, cultivated land, pasture and secondary forest. (Photo. 6)

2. Study method

People of Montes Claros said that Palmito valley was the place where the woolly spider monkey was the most frequently seen and Poltão valley was the second. Accordingly, I began my work with the plan to walk the Palmito valley repeatedly every day, following the woolly spider monkey as long as possible, once I found it. Eventually, I walked along the Palmito valley for 7 days and encountered woolly spider monkeys 4 times as follows, 1st: July 23, 8:45–9:15, 2nd: July 25, 16:00–17:35, 3rd: July 26, 7:08–7:10, 4th: July 26, 16:28–17:25.

3. Response to the observer

If the distance between observer and woolly spider monkey was more than 50 m, under the condition of the former being on the road and the latter on the tree, the former could observe the latter in fairly stable condition. It was hard to follow a group of woolly spider monkeys which was travelling. In the first and the third encounters the group shook me off soon although I tried to follow it. The warning

attitude of woolly spider monkey was thus considerably intense, while it would probably become weaker if I repeated the encounter (see below, vocalization). In the meanwhile, there also lived howler monkeys (*Alouatta fusca* ?) and tufted capuchins (*Cebus apella*), of which the latter was more alert than woolly spider, while the former were surprizingly tame and did not flee even when I drew near them under the tree on which it stayed.

4. Morphology and locomotion

The woolly spider monkey in Montes Claros was morphologically a bit different from the one which I saw in São Paulo Zoo. Regarding the latter, as partly described before, the face was very dark and the pelage was yellowish brown, while the former's face was flesh colored and the pelage was cream color or grey. The woolly monkey was called "mono grande" or simply, "mono" in Montes Claros. By Hill (1962), the regional variation of the face or pelage color seems to have been already mentioned by Vieira (1944).

I saw here, for the first time, the adult male of woolly spider monkey. The size of its testicles much surprized me. If the body of the woolly spider monkey were magnified to the size of a man its testicle would be as large as a soft ball. On the other hand, the clitoris of female was small, as had been confirmed in São Paulo Zoo, and was almost impossible to see in the field observation. In this way, the external genital organ of woolly spider monkey looks fairly different from those of other ateline monkeys. (Photos. 10, 11)

My impression is that locomotion of woolly spider monkey is rather similar to that of spider monkey in the way of moving on the branch using its arms and tail or climbing the trunk standing obliquely. (Photos. 2, 9)

5. Group composition and grouping pattern

According to the studies made so far, the woolly monkey in the wild is usually encountered as a bisexual group which consists of, from 10 odd to 50 individuals and whose membership is stable for a considerably long time (Nishimura & Izawa, 1975, Nishimura, 1976). On the other hand the spider monkey is usually seen as a group of several individuals or a lone individual. Moreover, the spider monkey group is temporary and it is common that an individual which is in a group is found in a group of quite different composition a few days or even a few hours later (Klein, 1972, Klein & Klein 1973, 1975). It was very interesting to learn the characteristics of the group of woolly spider monkeys compared to the woolly monkey and the spider monkey. However, due to the limitations of my short study period and the warning response of the woolly spider monkey, only insufficient answers to my inquiries were obtained.

August 26, 1977. At 16:28, I met a group of woolly spider monkeys at the left bank of Palmito Valley. At 16:38, an adult female and a juvenile, possibly a mother and her child, crossed to the opposite bank. The juvenile, travelling by itself, while being almost always at the side of the female, was equivalent to a two year old Japanese macaque. At 16:45, another couple of an adult female and a juvenile crossed to the right bank. This juvenile was a size smaller than the one which had crossed previously. At 16:50, I found two individuals on the tall tree in the left bank, an adult male on the top of it and an adult female on the branch 4 or

5 meters down the top. They were feeding on leaves. At 16:55, these two monkeys suddenly climbed down the tree and began to move upstream. I quickly walked about 30 meters upstream on the road and looked up the left bank; I observed six individuals, all of which looked adult, going upstream one by one through bushes. I am uncertain whether the adult male and female, which had been on the tall tree until a few mintes ago, were included in those 6 individuals.

From this observation, it is known that the group of woolly spider monkeys encountered that day contained, at least, from 8 to 10 adults (including at least one male and two females) and 2 juveniles. According to my personal experience, observations under this type of condition usually result in a lower calculation than would otherwise be the case. Taking this into consideration, it is very possible that the group encountered consisted of approximately 20 individuals. In my other three encounters as well, the size of a group, judging from the expanse of it in the forest, for instance, was thought to be much the same. From these observations it can be supposed that the woolly spider monkey lives as a fairly large, stable and cohesive group much as the woolly monkey rather than a small, loose and temporary group as the spider monkey.

I mentioned earlier that when I encountered a group of woolly spider monkeys on the 26th of August two adult females and two juveniles, who were thought to be two couples of mothers and their children, moved to the opposite bank parting from other members of the group. After that, they continually fed on leaves and allowed me to observe them until it became dark and I left. While I was observing them, it was not known at all where the other members of the group were. I performed very similar observation as that on the previous day.

August 25, 1977. At 16:00, I found a group of woolly spider monkeys on the right bank of Palmito valley and continued to observe them until 17:15. At 17:20, when I came 200–300 meters down the stream, I found two adult females and two juveniles on the bank of same side. One of the females took a threatening posture, hanging down by the tail and feet and bobbing the head. After that they went on feeding at ease, while those individuals whom I had been observing until a few minutes before remained vigilant.

Two observations described above remind me of an encounter with spider monkeys in the Amazon. It is rather rare for the woolly monkey that females and infants or juveniles alone were apart from other members of the group. For the woolly monkey the female is usually more shy than the male and it is very rare that the female alone assumes a threat posture or that she does it earlier than the male. By contrast, it is rather common for the spider monkey to form groups consisting of females or females and youngs alone (Klein, 1972). Moreover, the female spider is no more shy than the male.

6. Vocalization

When I asked the people in Montes Claros what the vocalization of woolly spider monkey was like, it was common for them to reply bit bashfully, "O mono canta como um cabalo (The monkey neighs like a horse)." Mr. São Francisco, the worker of Rio Doce Park gave the same answer and Aguirre (1971) also reports that one of the vocalizations of woolly spider monkey resembles the neigh of a young horse. I have never heard of any primate emitting the sound like a horse. So, I wished to hear

the vocalization of woolly spider monkey to confirm these reports.

On the first encounter with the woolly spider monkey, I walked on and on into the group, when an adult male came to me, hung down by the trail, stretched out his hand, looked at me carefully and emitted [ki·ki], the sound accompanying a sense of slight uneasiness. I continued to be surrounded by them, when they began to emit the sound [chun!] [chun·chun] [kyot!] [kyot·kyot] simultaneously, which was higher-pitched and with a sense of more uneasiness and alertness than the first. One or two minutes after these sounds were emitted the whole group moved away. Vocalizations which closely resemble these, not only for the characteristics of the sound itself but also for the situation in which it was emitted, have been found among the vocal repertoire of the woolly monkey.

At the second and third encounters no sound was heard. When they were silent I felt they were watching me with more alertness than when they emitted the sound accompanying the sense of uneasiness and alertness. At the fourth encounter, on the other hand, many vocalizations were heard. This might mean that they were accustomed to my presence.

Within the first several minutes at the fourth encounter, I heard the sound [kihihii.....n], which was high-pitched and continuous, three or more times. At the moment I heard this, I thought it was just what was called "the neigh of a horse" and, at the same time, it quite resembled some vocalizations of the woolly monkey, which I had described as [churr.....n] (Nishimura, 1974, 1976). Namely, this vocalization of woolly monkey, if it got higher and a bit more husky, will be quite near to [kihihii.....n] sound of woolly spider monkey. To my experience, the [churr .....n] of woolly monkey is usually emitted, "when the group has just arrived at the feeding site, when it is about leaving there, or when it is moving slowly while feeding, namely, when the location of group is more or less floating and the expanse of group is considerably large." It was at the situation similar to these that [kihihii.....n] sound of woolly spider monkey was heard.

During the fourth encounter, another sound described as [uki·ki·ki] was heard, sometimes intermixing with the [kihihii...n] sound. It was like the vocalization with the sense of alertness, which was heard during the first encounter, but it was higher and more keen and lasted longer. Besides, the sound [gu·gu], which was low and emitted from the deep in throat, was exchanged between two females who were feeding quietly 10 m apart each other.

The above are the only vocalizations which I was able to hear from the woolly spider monkey. In conclusion, we might say that the vocalization and vocal repertoire of this species closely resembles that of the woolly monkey.

7. Feeding habits and habitat

The woolly spider monkey I observed were mostly engaged in feeding. As far as I could see, they fed on leaves of evergreen trees. From this observation my impression is that the feeding habits of the woolly spider monkey are considerably different from those of the woolly monkey or the spider monkey, since the latter, and especially the spider monkey, strongly prefer fruits (Klein, 1972; Klein & Klein, 1975, Iazwa, 1975). But my visit to Montes Claros was shortly after the peak of dry season and almost no fruit was found in the forest. Taking the seasonal change of fruits into consideration,

the woolly spider monkey's feeding on leaves probably shows only one side of his feeding habits. A paper by Aguirre (1971) shows the stomach contents of woolly spider monkeys which were collected in the States of Rio de Janeiro and Sao Paulo, in January 1968 and September 1959 respectively. In both cases it is understood that they took lots of fruits. However, it might be worth notice that the woolly spider monkey lives in an area where there is almost no fruit in some seasons, in contrast to the habitats of the woolly monkey or the spider monkey.

It is said the woolly spider monkey is quite fond of Palmito palm (*Euterpe edulis*). I heard this in Montes Claros and in Rio Doce Park and Aguirre (1971) also says the same, quoting informations from hunters. I myself obtained the indirect evidence that the woolly spider monkey was fond of palmito. First, whenever I met the woolly spider monkey lots of palmitos were found close to it. Second, I saw many palmitos, whose leaves attached to the end of trunk were twisted or broken. It would be probably due to its alertness that I could not observe the scene of its feeding the palmito. When the woolly spider monkey was feeding on the pith at the end of trunk, it would have had to clearly expose its whole body to the observer since the palmito palm, even the tallest one, does not exceed 15 meters in height. (Photo. 7)

The place in which I encountered the woolly spider monkey was confined to the area extending a little less than a kilometer along the road in the upper stream of Palmito Valley. This area was where the vegetation of tropical rain forest type was preserved in the best condition in Montes Claros. Against this, the howler monkey and the tufted capuchin, which also live in Montes Claros, were found in wider range. The howler was often found on the tall tree along the valley alike the woolly spider monkey, while the howler being found also in the area where such trees remained as a small patch. For example, the howler was found even in a small grove near the house or cultivated field. Moreover, the howler was found not only along the valley, but also on the mountain slope, whose vegetation was drier as mentioned before. The tufted capuchin lived in wider range than the howler. The former visited also secondary growth.

The area where the vegetation of tropical rain forest type remained in comparatively wide range in Montes Claros, other than the upper stream of Palmito Valley, seemed to be confined to the upper part of its branch stretching south sough-west, and the upper part of Poltâo Valley. The total of these areas including that in the upper stream of Palmito Valley, was only about a square kilometer. Thus the area of which the woolly spider monkey actually availed itself was very restricted in the forest of Montes Claros, while the forest of Montes Claros itself being only 5.6 km^2 was much like a "solitary island" for woolly spider monkey.

8. The future of woolly spider monkey in Montes Claros

The future of the woolly spider monkey in Montes Claros is problematical. The preservation of the forest and the survival of woolly spider monkey have so far been secured due to Mr. Abdala's personal interest. But, how long will this continue? Mr. Abdala seemed to understand well the value of what he had so far done. However, it might happen that someday he will have to cut down the forest by unforeseen economic reasons, and such a possibility will be likely increase in the generations to come. The most concrete action which could be taken at present to preserve this

highly valuable habitat for the future would be to have this area declared a state or federal reserve.

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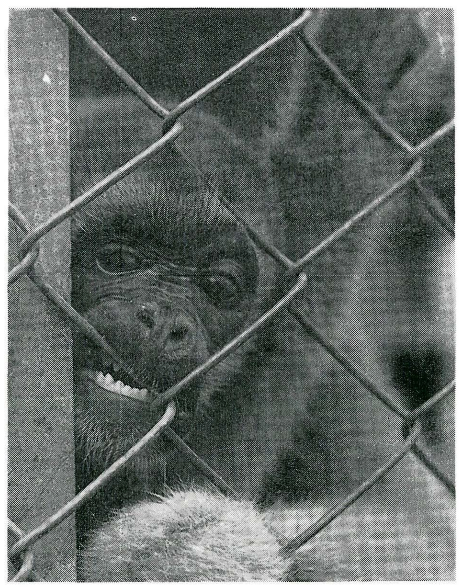
Photo. 1. Humboldt's woolly monkey (*Lagothrix lagothricha*) in the Caquetá River.

Photo. 2. Long-haired spider monkey (*Ateles belzebuth*) (photograph taken by K. Izawa).

Photo. 3. The face of woolly spider monkey (female) kept in São Paulo Zoo.

Photo. 4. Juvenile woolly spider monkey in São Paulo Zoo.

3



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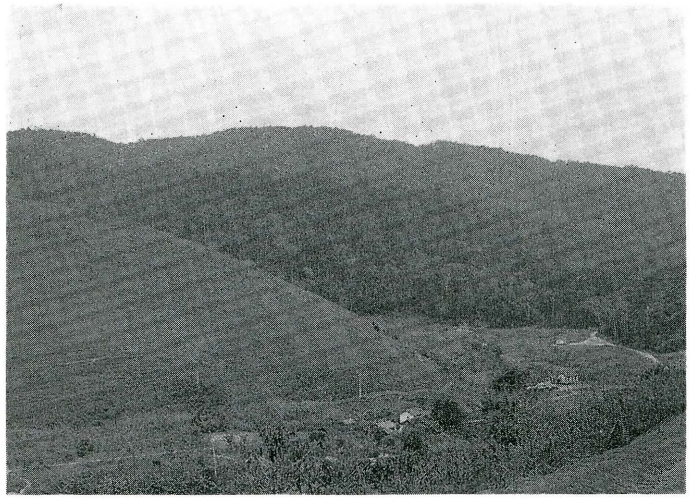

Photo. 6. The forest in Montes Claros, surrounded wholly by cultivated lands.

Photo. 5. Along the road in Palmito Valley, Montes Claros.

Photo. 7. Palmito palms (*Euterpe edulis*), Montes Claros.

Photo. 8. Woolly spider monkey taking leaves.

Photo. 9. Woolly spider monkey moving through trees.

Photo. 10. Male woolly spider monkey. Take notice of its testicles.

Photo. 11. Fleeing male woolly spider monkey.

Photo. 12. Woolly spider monkey watching the observer from a far. Its face is not so dark as that in the State of São Paulo.